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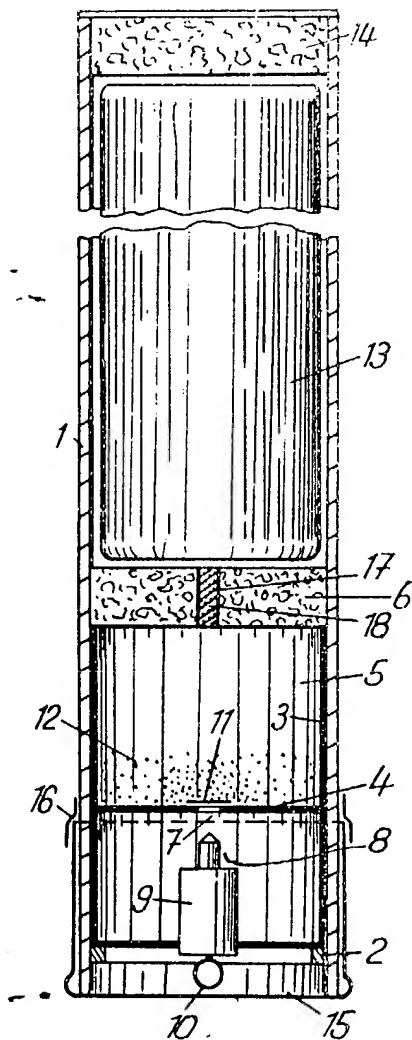


Fig. 1

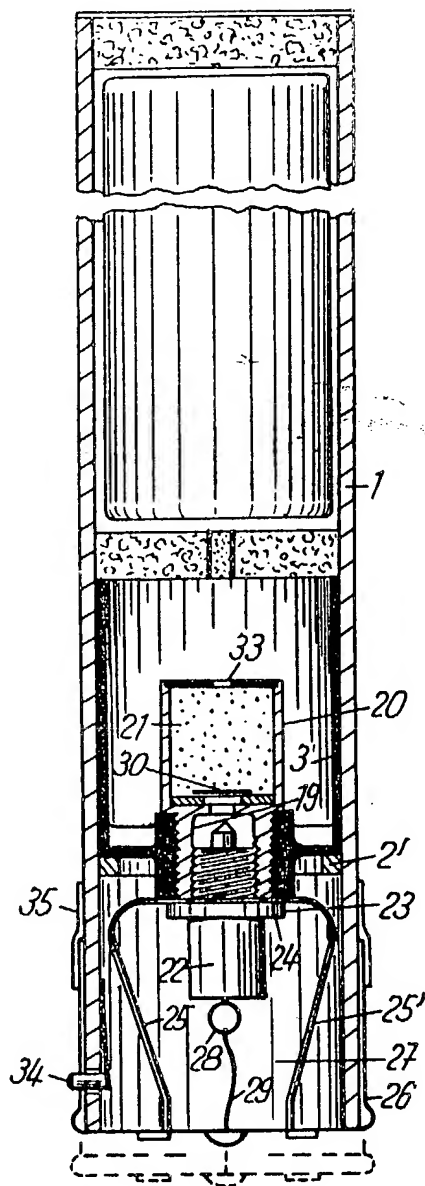


Fig. 2

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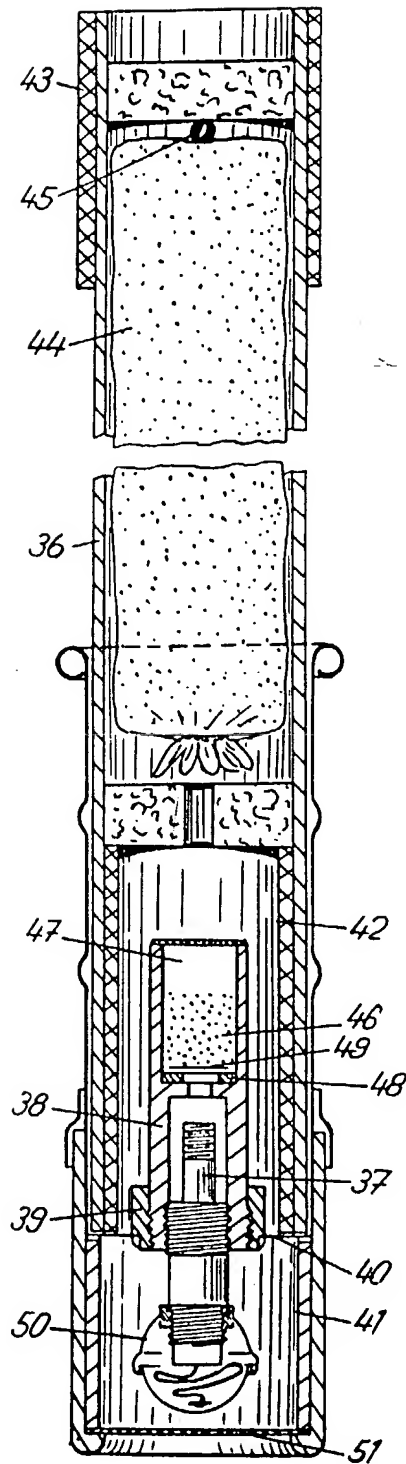


Fig. 3

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CANADIAN PATENT

EJECTION DEVICE FOR WARFARE AGENTS

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The present invention relates to a device by which warfare agents, such as inflammable substances, smoke-generating agents, and other charges, can be ejected over increased distances.

Flame throwers of the type used hitherto are essentially based on the principle of ejecting a stream of easily inflammable fluid, such as hydrocarbon, creosote oil, or sulphocarbon, or other inflammable oils, or other substances rendered gelatinous by gelatinizing agents, with the help of the pressure created by compressed gases, such as nitrogen gas, and of igniting such ejected substances by means of an igniting device located at the nozzle of the ejection hose.

The gas pressure needed to eject the substances in these known devices is generated either by a cartridge filled with compressed gas, or by a so-called pressure cartridge which by ignition generates a gas of the required pressure. Such well-known flame-throwing devices represent a type of apparatus which due to its design is comparatively weighty and in which, as a consequence of the weight, either the amount of warfare agents, i.e. flame oil, carried or the effective range must be reduced, because otherwise handling will be more difficult which in its turn places a restriction upon the possibilities of employment.

The ejection device which forms the subject of the present invention is essentially different from these known devices in that the substances to be ejected, as for example flame agents, which may be in the form of a powder, a pastous substance, a fluid, or a substance involving a compressed gas, and which may be ready-packed or housed in an easily destructible container, are inserted in a tube which also comprises an ejection charge with a primer and priming device to set off the ejection charge.

Depending upon the purpose for which it is to be employed and upon the type of charge to be ejected, the tube is made of a lightweight material, such as cardboard or compressed cellulose material of the type



commercially employed for packing, or of a suitable plastics, and it is desirable to reinforce these tubes, preferably in the general area containing the priming device, by an externally fitted sleeve of metal or other refractory and mechanically resistant material, such as asbestos sheet. The interior of the tube is subdivided into two chambers of different lengths by a shoulder and an insert placed thereon. The shorter, smaller chamber constitutes the priming chamber; the longer chamber houses the charge to be ejected.

10 The insert element serves at the same time as a support for the charge to be ejected, which will be described in more detail at a later stage, and as a piston which under the influence of the pressure developed in the smaller chamber in a manner to be described ejects the charge from the tube. Said element is made of a material which is non-combustible at the temperatures generated by the primer, for example of cork, asbestos, or of a compressed material which has been rendered insensitive against the effects of the priming process by a known method of impregnation.

20 In the rear of the piston insert, there is located the gas pressure chamber and the priming device; immediately adjacent the piston insert there is the gas pressure chamber containing the charge which will generate the ejection pressure. It will be observed from the drawings that the charge only partially fills its chamber. Next to said gas pressure chamber and connected to it by an opening which is either filled or covered with an easily inflammable and combustible substance, there is the primer which in its turn is sealed off against the space housing the primer actuating mechanism.

30 This latter space is in its turn closed off at the end of this side of the tube by a destructible seal. This safety cover of the primer actuating mechanism may consist of a destructible disc made of either a fragile, thin plastics or of cardboard. It may also be in the shape of a cap, possibly a cap which is longitudinally slidable and mounted at the rear end of the tube in such a way that after withdrawal of a safety pin

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houses the priming device, and which is inserted in the smaller chamber, said smaller chamber being separated from the large chamber housing the charge to be ejected by the piston insert;

Figure 2 is a longitudinal cross section of another embodiment primarily instead for cases in which the ejection charge and the priming mechanism are later inserted, thus making the device suitable for repeated use; and

Figure 3 is an embodiment also suitable for repeated use.

10 In detail, figure 1 shows a tube 1 of hard cardboard whose internal diameter is between 3 and 4 cm, and whose length is between 35 and 45 cm. A pot-shaped sleeve 3 is inserted from the lower end of the tube and supported by an annular element 2, which annular element is either glued or bolted to cardboard tube 1.

The pot-shaped sleeve 3 is subdivided into two chambers by an internal wall; the upper chamber 5 being closed at its upper end by the piston insert 6 made of e.g. cork. The piston insert is supported by the upper rim of sleeve 3.

20 An opening 7 is provided in internal wall 4, which opening 7 is situated above the tubular element 8 of a pull-actuated primer 9 provided with a pull ring 10. Opening 7 is closed by a celluloid disc glued to the edge of the opening on top of internal wall 4.

The ejection charge 12 is made up of black powder. The charge 13 to be ejected consists of powder, pastous substance, or fluid in a cellulose derivate foil container of cylindrical shape. A cork plug 14 closes the ejection end of tube 1 and is held in position by a light coat of lacquer or parafin which will easily yield to pressure.

A cap 15, fixed to the tube by an adhesive tape 16, is used to cover the pull ring 10.

30 Piston insert 6 serves as a seal as well as a dam. It is provided with a bore 7 which is closed by a filling 18 of easily inflamm-

or similar device the primer can be actuated by simply pulling backwards the cap which is connected to the actuating mechanism.

The tube chamber situated in front of the piston insert accommodates the material to be ejected, such as inflammable powders, e.g. powder mixtures containing red phosphorus, or inflammable pastous substances or fluids of a known type, which it is desirable to put in a container suited for the particular charge to be used, e.g. an envelope made of cellulose derivate foil for powders and pastous substances, or of foil material, such as polyvinylchloride, thin-walled glass or other material known to be adequate for use in conjunction with fluids.

Instead of inflammable substances such containers may also hold smoke-generating agents, explosives, fire-extinguishing substances, such as sodium hydrogen carbonate or mixtures containing it, as well as coloured or non-coloured dust, such as stone or kieselgur powder, for exercise purpose.

Pressure generating, gasifiable substances or mixtures, either in loose form or filled in bags, and placed in the pressure chamber or in a container which may be connected to the priming device, may be used as an ejection charge. The front end of the tube is closed by a plug which closely fits into the front opening and seals the charge to be ejected against the exterior, said plug being made of cork, rubber, or a compressed fibrous material. The front end of the tube is preferably provided with a short sleeve-like element which serves as a hold to be engaged by the hand of the operator, and which may be so shaped as to offer protection against the ejected agent, flame substance, or the like.

By way of further description, three embodiments of an ejection device for warfare agents in accordance with the present invention are illustrated in the accompanying drawing, in which: Figure 1 is a schematic longitudinal cross section, showing a device with a special insert element, which element constitutes the ejection pressure chamber and

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means of an adhesive plastic strip 35. The chamber which houses the charge to be ejected, its filling, piston insert, and sealing plug are as described with reference to figure 1.

10 In using this ejection device, tape 35 is taken off, cap 26 is turned around the longitudinal axis until the bayonet bolt enters the longitudinal slit, whereupon the cap 26 is pulled back and allowed to return. In this way, the primer is actuated, foil 30 destroyed, and the ejection charge is ignited. Pressure is generated in container 20, the thin layer 33 on the lid is destroyed, and the pressure evolving in pot-shaped sleeve 3' pushes the piston upwards and outwards, thus ejecting the charge which in its turn pushes out the sealing plug.

20 In accordance with figure 3, the lower end of tube 36 is inserted in a metal sleeve which in its turn is provided with rims on the outside to ensure a better grip and to reinforce the walls of the explosion chamber. A delayed-action primer 37 is screwed into casing 38 which is itself screwed into a threaded element 39, said element being mounted in the internal separating wall 40. Two sleeves of asbestos 41 and 42 and one muzzle hand-grip 43 of asbestos are provided. Bag 44 which is made of cellulose derivate foil is tightly filled so as to avoid the forming of a "tail", e.g. a flame or smoke tail, which might betray the firing position prior to the target being hit.

The ejected charge is detonated by the impact or delayed-action fuze 45. The ejection charge 46, e.g. black powder, is sufficient to burn out of chamber 47 after having inflamed celluloid ring 48 with its thin layer of collodion 49, and to eject the charge without recoil. Capsule 50 of the primer, containing the pull string and being screwed on, is closed off by a thin, fragile disc 51.

This embodiment is particularly suitable for repeated use.

30 The embodiments shown have been shown as examples only and may be changed while remaining within the scope of the invention. Instead of

able material, the filling being held by an easily inflammable glue. This serves to bring about an ignition of the charge to be ejected subsequent to the actuation of primer 9 whose flame has destroyed disc 11 and thus ignited the ejection charge.

In addition, a delayed-action fuze, a desintegrating charge, or a desintegrating charge with an impact fuze may be placed in the chamber which houses the charge to be ejected.

In figure 2, a short pot-shaped sleeve 3' has been inserted in tube 1, and is supported on an annular element 2'. An opening is situated in the center of the bottom plate of pot-shaped sleeve 3', and through this opening protrudes an elongation 19 of the pot-shaped container 20 which contains the ejection charge 21. The outer surface of elongation 19 is provided with a thread onto which is screwed primer case 22.

Between flange 23 of primer case 22 and elongation 19, there is placed a ring 24 of spring steel provided with two band-shaped strips 25 and 25' diametrically and radially protruding from the outer edge of said ring. Strips 25 and 25' are bent downwards and their free ends are mounted on the inside bottom plate of a cap 26.

Cap 26 off the priming chamber 27 to the exterior. Pull ring 28 of the primer is connected to the bottom plate of cap 26 by means of a string 29. A thin foil 30 of celluloid covers the lower opening 31 of the pot-shaped container 20. The ejection charge, e.g. black powder, is covered by a lid whose opening 33 is closed with an easily inflammable material, such as a thin collodion layer.

A bayonet closure 34 holds cap 26 in a locked position. Upon turning of cap 26 to a certain extent, it can be drawn back until the bent spring-strips 25 and 25' are fully straightened and prevent further movement. In addition, the backward travel of cap 26 is limited by the length of the bayonet slit.

Cap 26 is secured against premature unlocking and actuation by

a piston-like insert, the container holding the charge to be ejected may serve as a piston, in which case it will be preferable to reinforce the bottom. Ignition will be caused immediately by the ejection charge, for which purpose easily inflammable material may be provided at the lower extremity of the charge to be ejected and immediately upwards of the primer. If required, there may also be devices in the nature of a delayed-action fuze.

10 Moreover, the container of the charge to be ejected may be provided with an impact fuze or with delayed-action fuzing assemblies which will become effective upon bursting of the container. Finally, the device in accordance with the present invention may be fitted for exercise purposes with an ejection spring instead of a charge. The depressed spring may be released by any of a number of known devices, e.g. by a string withdrawing a catch, or the like.

Operation of the device is very simple and does not presuppose long training as in the case of the flame throwers mentioned at the beginning. The tube is simply held in one hand and either supported against a suitable rest (stone, tree), or gripped by the other hand after the primer or spring release mechanism has been actuated.

20 The advantage of this weapon as compared with hand-thrown weapons is that it cannot be thrown back if it has been ejected prematurely, and that normally the tube with the priming device can be used repeatedly. Its production is very simple and economical, and it can easily be re-loaded even by un-skilled personnel.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE
PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A hand-held weapon for the aimed discharge of warfare agents, consisting of a tube in which a useful charge is housed between a muzzle plug and a perforated piston supported on a shoulder and of a propellant charge with a primer intended for its ignition in the tube behind the piston, characterized in that the propellant charge is in a tube chamber which enables propellant gases to be generated and that the piston, which separates this tube chamber from the useful charge in a container, consists of non-combustible material and in that a dividing wall which closes the tube chamber against the primer is provided, where the dividing wall has a bore located on the extension of the axis of the primer located below the tube chamber, said bore being sealed by means of easily inflammable material.
2. A hand-held weapon according to claim 1, characterized in that the bore of the piston which is located in the axis of the primer is filled with an inflammable substance.
3. A hand-held weapon according to claim 1 or 2, characterized in that the dividing wall between the tube chamber and the priming space carries a pot-shaped container for housing the propellant charge, said container being screwed into the dividing wall, and that in its bottom said container has an extension with internal thread for the reception of the primer and for the formation of a closed priming space, said priming space having a bore sealed off by means of a combustible material and located on the axis of the primer.
4. A hand-held weapon according to claim 1 characterized in that in the region of the tube ends the tube is fitted with protective covers.
5. A hand-held weapon according to claim 4 in which the protective covers are asbestos covers of the priming chamber and/or of the tube chamber.